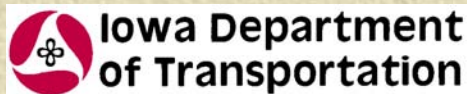
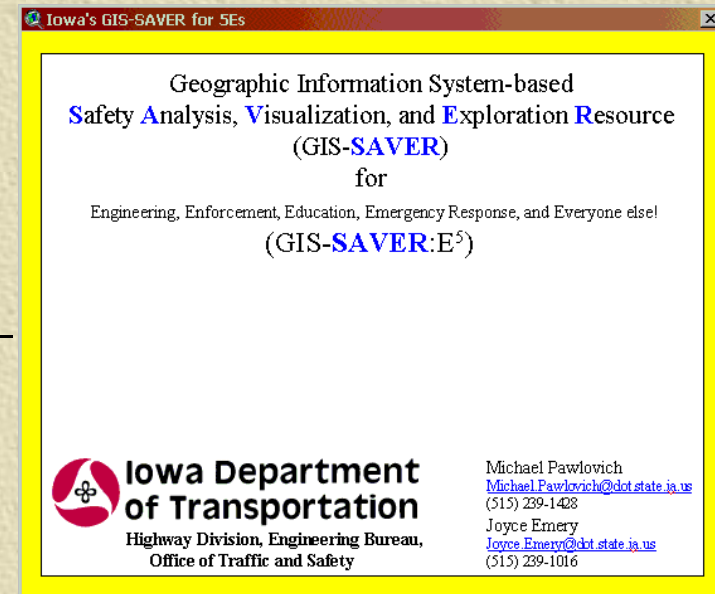
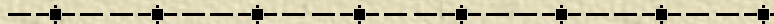


# Geographic Information System-based Safety Analysis, Visualization, and Exploration Resource (GIS-SAVER) for

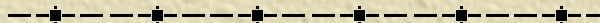
Engineering, Enforcement, Education, Emergency response, and Everyone else!

(GIS-SAVER:E<sup>5</sup>)



Highway Division, Engineering Bureau,  
**Office of Traffic and Safety**

Phone: (515) 239-1557 Fax: (515) 239-1891



Contacts:

Technical: Michael D. Pawlovich

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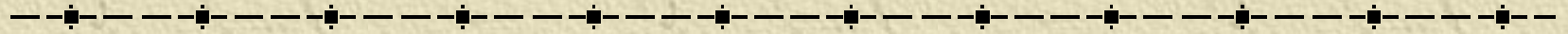
(515) 239-1428

General: Joyce Emery

[Joyce.Emery@dot.state.ia.us](mailto:Joyce.Emery@dot.state.ia.us)

(515) 239-1016

# Outline



✦ Why SAVER?

✦ Iowa's Progression

✦ SAVER



# Why SAVER?

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## ✦ Influences/Inputs

- ◆ Iowa SMS → 5 Es
- ◆ Iowa STRAC
- ◆ MMUCC
- ◆ CODES
- ◆ Road files mapping and improvement (GIMS)
- ◆ Data files spatial connections (LRS)
- ◆ TraCS

✦ Not just crash data anymore!!!

✦ S is for Safety, A is for Analysis...

# Iowa SMS and the 5Es

---

✦ 5Es vs. 3Es

- ✦ Engineering
- ✦ Enforcement
- ✦ Emergency response
- ✦ Education
- ✦ Everyone else!



# Iowa's Progression

---

## Analysis

- ✦ Mainframe ALAS 1970s
- ✦ PC-ALAS 1980s
- ✦ Issues/Problems 1990s
- ✦ Dual effort
  - ◆ Access-ALAS (internal)
  - ◆ GIS-ALAS (external)
- ✦ Intersection Magic
- ✦ Iowa MMUCC 2000+
- ✦ CMAT/Access-ALAS
- ✦ SAVER + Magic Wands

TAS

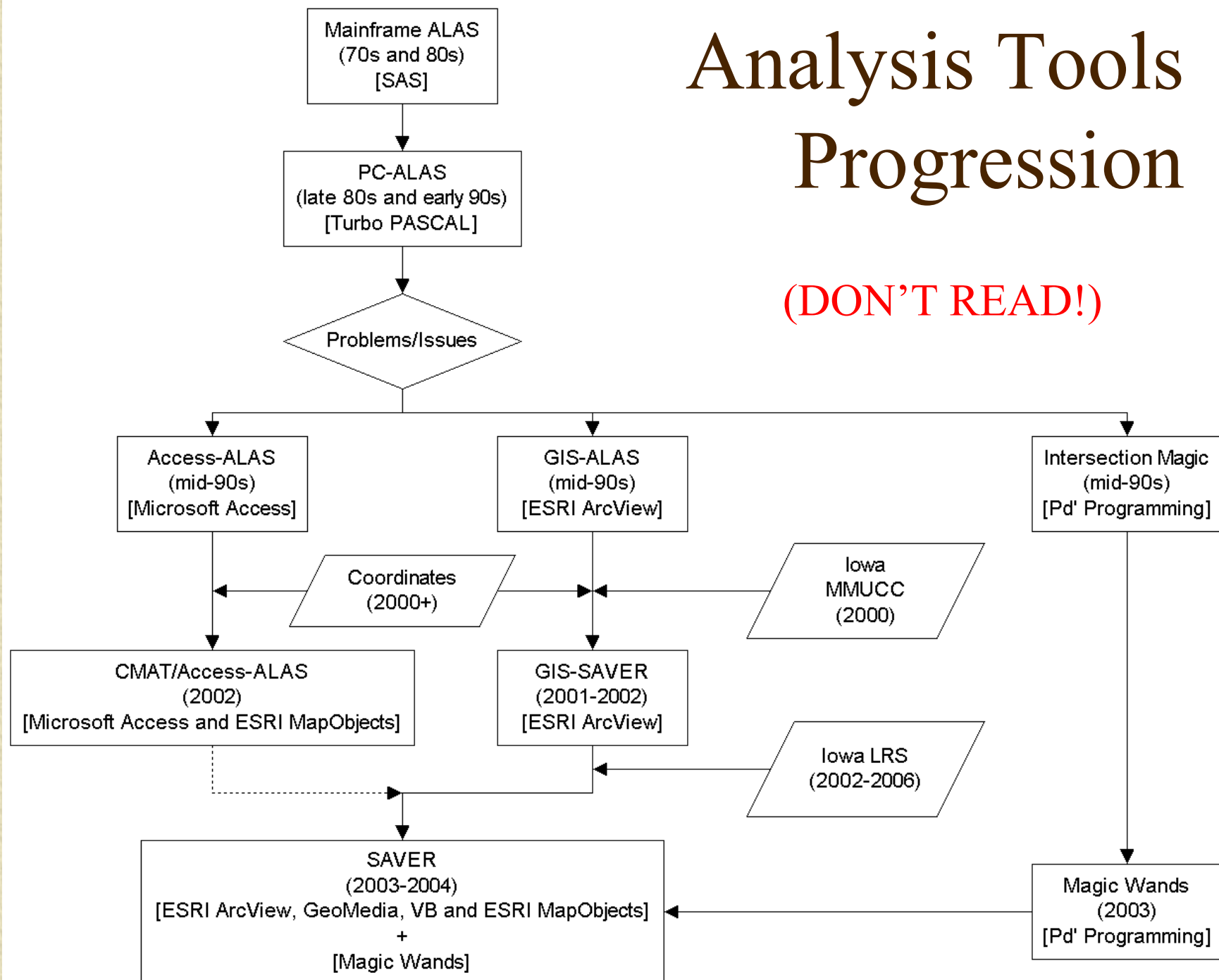
## Collection

- ✦ Former input method
- ✦ APS
- ✦ MARS/OIM
- ✦ Advantage Safety
- ✦ Iowa MMUCC
- ✦ TraCS

MVD

# Analysis Tools Progression

(DON'T READ!)



# Continuity

---

✦ Complexity

◆ mid-90s ↑

◆ 2002+ ↓?

✦ Difficult

✦ Vital!



# SAVER

- 
- ✧ GIS vs. VB
  - ✧ Configuration files w/ minimal code
  - ✧ Data: 5Es

## ✧ Goals

- ◆ Reconsolidate our tools!
- ◆ Continue/Improve Level-Of-Service
- ◆ Extend capabilities



# GIS-SAVER

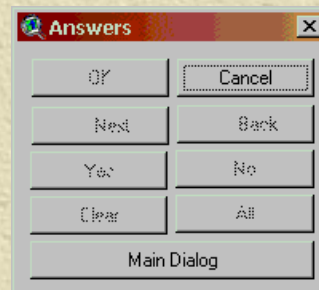
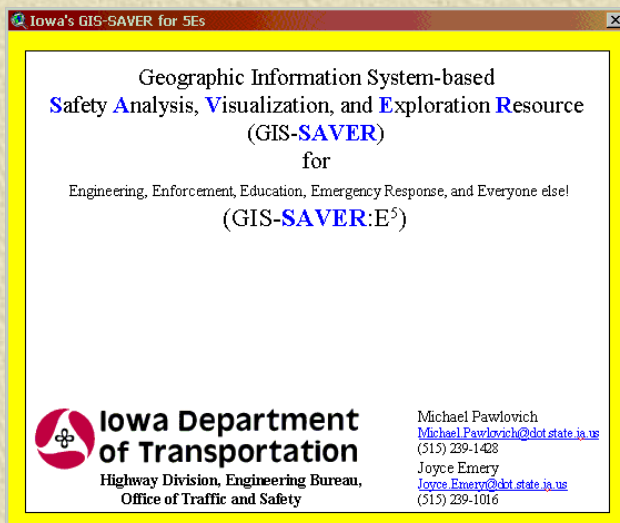
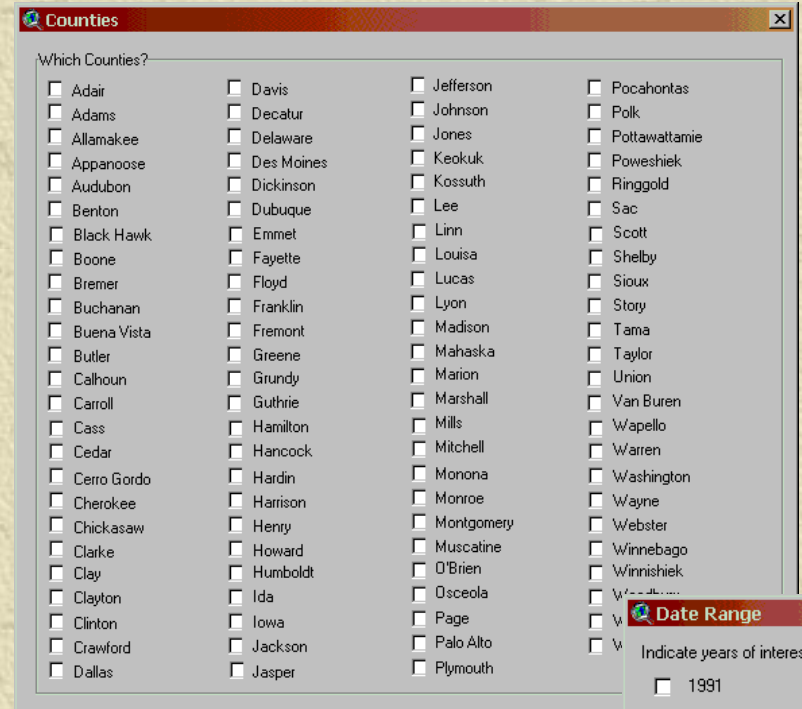
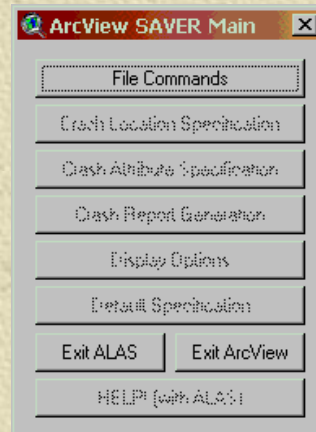
- 
- ✦ AV-SAVER → ESRI's ArcView 3.2/3.3
  - ✦ GM-SAVER → GeoMedia
  - ✦ Costs for GIS software and configuration
  - ✦ SAVER + GIS capabilities

# VB-S AVER

- 
- ✦ VB and ESRI's MapObjects (?)
  - ✦ Replaces Access-ALAS/CMAT
  - ✦ Low-cost/No cost alternative
  - ✦ No GIS capabilities beyond SAVER

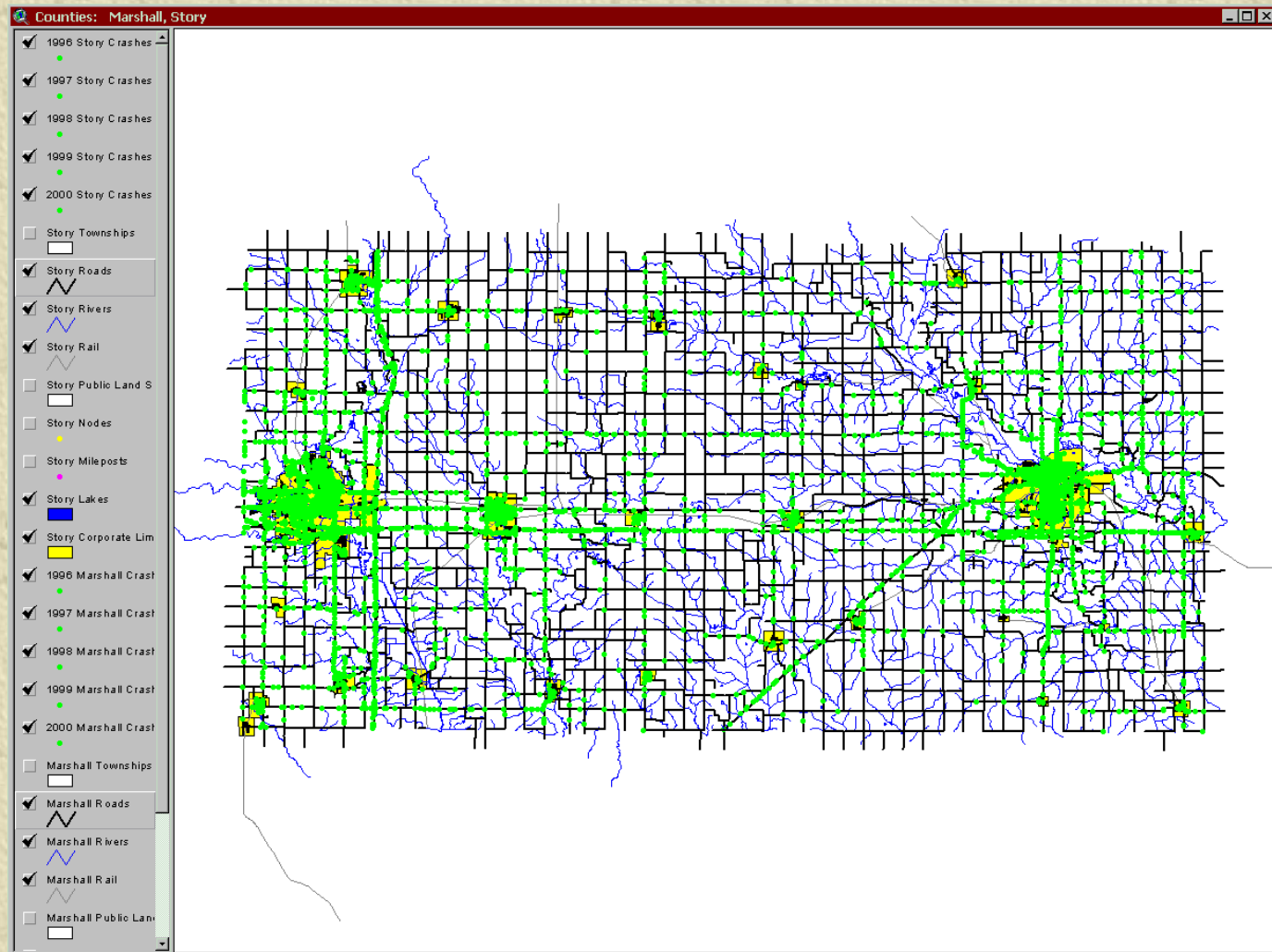


# SAVER: Look & Feel → Dialogs





# SAVER: Look & Feel → Maps



# SAVER: Look & Feel → Reports

**Crash Numbers**

Total number of crashes in selected region:  
 Marshall  
 Story  
 for years:  
 1996  
 Marshall  
 Crashes: Fatal: 0 Injury: 0 PDO: 2  
 Injuries: Unknown: 0 Fatal: 0 Major: 0 Minor: 0 Possible: 0  
 Story  
 Crashes: Fatal: 0 Injury: 1 PDO: 1  
 Injuries: Unknown: 0 Fatal: 0 Major: 0 Minor: 1 Possible: 0  
 1997  
 Marshall  
 Crashes: Fatal: 0 Injury: 0 PDO: 3  
 Injuries: Unknown: 0 Fatal: 0 Major: 0 Minor: 0 Possible: 0  
 Story  
 Crashes: Fatal: 0 Injury: 1 PDO: 2  
 Injuries: Unknown: 0 Fatal: 0 Major: 0 Minor: 0 Possible: 1  
 1998  
 Marshall  
 Crashes: Fatal: 0 Injury: 3 PDO: 0  
 Injuries: Unknown: 1 Fatal: 0 Major: 2 Minor: 1 Possible: 1  
 Story  
 Crashes: Fatal: 0 Injury: 1 PDO: 3  
 Injuries: Unknown: 0 Fatal: 0 Major: 1 Minor: 0 Possible: 1  
 1999  
 Marshall  
 Crashes: Fatal: 2 Injury: 1 PDO: 0  
 Injuries: Unknown: 0 Fatal: 2 Major: 4 Minor: 0 Possible: 3  
 Story  
 Crashes: Fatal: 0 Injury: 5 PDO: 6  
 Injuries: Unknown: 0 Fatal: 0 Major: 1 Minor: 9 Possible: 1  
 2000  
 Marshall  
 Crashes: Fatal: 1 Injury: 0 PDO: 2  
 Injuries: Unknown: 0 Fatal: 1 Major: 0 Minor: 1 Possible: 0  
 Story  
 Crashes: Fatal: 0 Injury: 4 PDO: 1  
 Injuries: Unknown: 0 Fatal: 0 Major: 2 Minor: 2 Possible: 4  
 meeting the following criteria:  
 (This feature currently not operational.)  
 equals:  
 Crashes: Total: 39 Fatal: 3 Injury: 16 PDO: 20  
 Injuries: Total: 39 Fatal: 3 Major: 10 Minor: 14 Poss/Unk: 12

OK

Accident Summary Sheet																
Crash No.	Count/Number	Crash Type	Date	Time	Light	Surf. Cond.	Major Cause	Day	Time/Dir	Age	Gender	Residence	Surf. Cond.	Eq. Inv?	Pay/Exp	Remarks
1990023951	604/399		11/8/96	17:00	Day	Dry	Vision Obscured	Thursday	East	48	Female	Unknown	Ice	Unknown	2700	
1990219745	6022227	Single	20096	16:00	Day	Dry	Unknown	Wednesday	West	39	Male	Unknown	Dry	Unknown	500	
1990210502	6011664	Side-swipe/Same Direction	21556	23:00	Dark - Roadway not Lighted	Dry	Failure to Have Control	Thursday	East	50	Male	Unknown	Ice	Unknown	7500	
199041301	6046819	Bicycle	72396	21:35	Dark - Roadway not Lighted	Dry	Headlights Not On	Tuesday	East	71	Male	Unknown	Dry	Unknown	475	Minor (Bruises/Abrasions)
1997022231	7027223	Other	41137	23:00	Dark - Roadway not Lighted	Snow	Failure to Have Control	Friday	East	40	Male	Unknown	Dry	Headlights Not On	Unknown	
1997031008	7038487	Rear End	61887	11:50	Day	Dry	Following Too Close	Wednesday	West	19	Male	Unknown	Snow	Unknown	4500	
1997036043	7044502	Single	70797	23:00	Dark - Roadway not Lighted	Dry	Animal	Monday	East	24	Female	Unknown	Dry	Unknown	500	
1997027748	7034301	Rear End	51287	14:50	Day	Dry	Following Too Close	Monday	West	29	Male	Unknown	Dry	Unknown	6500	Possible (Complaint of Pain)
1997056177	7070382	Side-swipe/Same Direction	102637	1:50	Day	Snow	Other	Sunday	East	52	Male	Unknown	Dry	Unknown	2000	
1997056464	7081548		1120597	18:00	Dark - Roadway not Lighted	Dry	Animal	Thursday	West	43	Male	Unknown	Dry	Unknown	1000	
1998007406	8011713	Other	30320	7:41	Day	Wet	Left of Center - Not Passing	Tuesday	West	20	Female	Unknown	Wet	Unknown	11750	Major (Incapacitating)
1998028020	8034721	Rear End/Left Turn	62498	18:40	Day	Dry	No Signal/Improper Signal	Wednesday	East	20	Female	Unknown	Wet	Unknown	8000	Major (Incapacitating)
1998037495	8038960		71298	16:20	Day	Dry	Unknown	Sunday	South	23	Male	Unknown	Wet	Unknown	1000	Possible (Complaint of Pain)
1998037963	8041964	Single	80808	8:20	Day	Dry	Passing Where Prohibited	Thursday	East	54	Male	Unknown	Wet	Unknown	1000	Minor (Bruises/Abrasions)
1998038332	8047410	Other	82290	10:45	Day	Dry	Passing - Interfered with Other	Saturday	East	54	Female	Unknown	Wet	Unknown	8000	Major (Incapacitating)
1998042930	8053016	Rear End	92988	21:40	Dark - Roadway not Lighted	Dry	Following Too Close	Tuesday	West	48	Female	Unknown	Wet	Unknown	2000	Possible (Complaint of Pain)
1998052230	8064254		110638	20:30	Dark - Roadway not Lighted	Dry	Animal	Friday	Unknown	50	Male	Unknown	Dry	Unknown	3000	
1998052101	8066201	Head-on	12393	2:20	Dark - Roadway not Lighted	Dry	Left of Center - Not Passing	Saturday	West	20	Male	Unknown	Dry	Unknown	30000	Fatal
1998070564	9045079	Head-on	72389	7:20	Day	Dry	Passing - Interfered with Other	Friday	East	77	Male	Unknown	Dry	Unknown	18000	Major (Incapacitating)
1998053400	9064627	Rear End	111399	22:00	Dark - Roadway not Lighted	Dry	Exceeding Speed Limit	Saturday	West	52	Male	Unknown	Dry	Unknown	16700	Major (Incapacitating)
1998059659	9068382	Rear End/Left Turn	12889	21:45	Dark - Roadway not Lighted	Dry	Passing Where Prohibited	Thursday	West	26	Male	Unknown	Dry	Unknown	1000	Minor (Bruises/Abrasions)
1998060828	9011032	Head-on	21899	18:15	Dark - Roadway not Lighted	Ice	Failure to Have Control	Thursday	West	21	Female	Unknown	Ice	Unknown	20000	Minor (Bruises/Abrasions)
Major Cause Injury Summary Sheet (Textual)																
Year	Major Cause	Total Crashes	Fatal Crashes	Inj Crashes	PDO Crashes	Total Fatalities	Major	Minor	Possible	Unknown						
1996	Failure to Have Control	1		1		1										
	Headlights Not On	1														
	Vision Obscured	1														
	Unknown	1														
1997	Animal	2		2												
	Following Too Close	2		1	1											
	Failure to Have Control	1		1												
	Other	1		1												
1998	Animal	1		1												
	Passing Where Prohibited	1		1												
	Passing - Interfered with Other	1		1												
	Left of Center - Not Passing	1		3												
	Following Too Close	1		1												
	No Signal/Improper Signal	1		1												
	Unknown	1		1												
1999	Animal	5		4	2											
	Passing Where Prohibited	1		1												
	Passing - Interfered with Other	1	1													
	Left of Center - Not Passing	1	1													
	Exceeding Speed Limit	1		1												
	Improper Lane Change	1		1												
	Following Too Close	1		1												
	Failure to Have Control	1														
	Unknown	2		2												
2000	Animal	2		1	2											
	Ran Stop Sign	1	1													
	Speed Too Fast for Conditions	1		1												
	Following Too Close	1		1												
	Failure to Have Control	3		2	1											



# SAVER: Functionality

---

- ✦ Identify location – broad and specific
- ✦ Query
- ✦ Report
- ✦ Display/Visualize



# SAVER: Examples

**Crash Numbers**

Total number of crashes in selected region:  
Muscatine

for years:

1992  
Muscatine  
Crashes: Fatal: 0 Injury: 0 PDO: 1  
Injuries: Unknown: 0 Fatal: 0 Major: 0 Minor: 0 Possible: 0

1993  
Muscatine  
Crashes: Fatal: 0 Injury: 1 PDO: 1  
Injuries: Unknown: 0 Fatal: 0 Major: 0 Minor: 0 Possible: 1

1994  
Muscatine  
Crashes: Fatal: 0 Injury: 0 PDO: 1  
Injuries: Unknown: 0 Fatal: 0 Major: 0 Minor: 0 Possible: 0

1995  
Muscatine  
Crashes: Fatal: 0 Injury: 2 PDO: 1  
Injuries: Unknown: 0 Fatal: 0 Major: 0 Minor: 0 Possible: 3

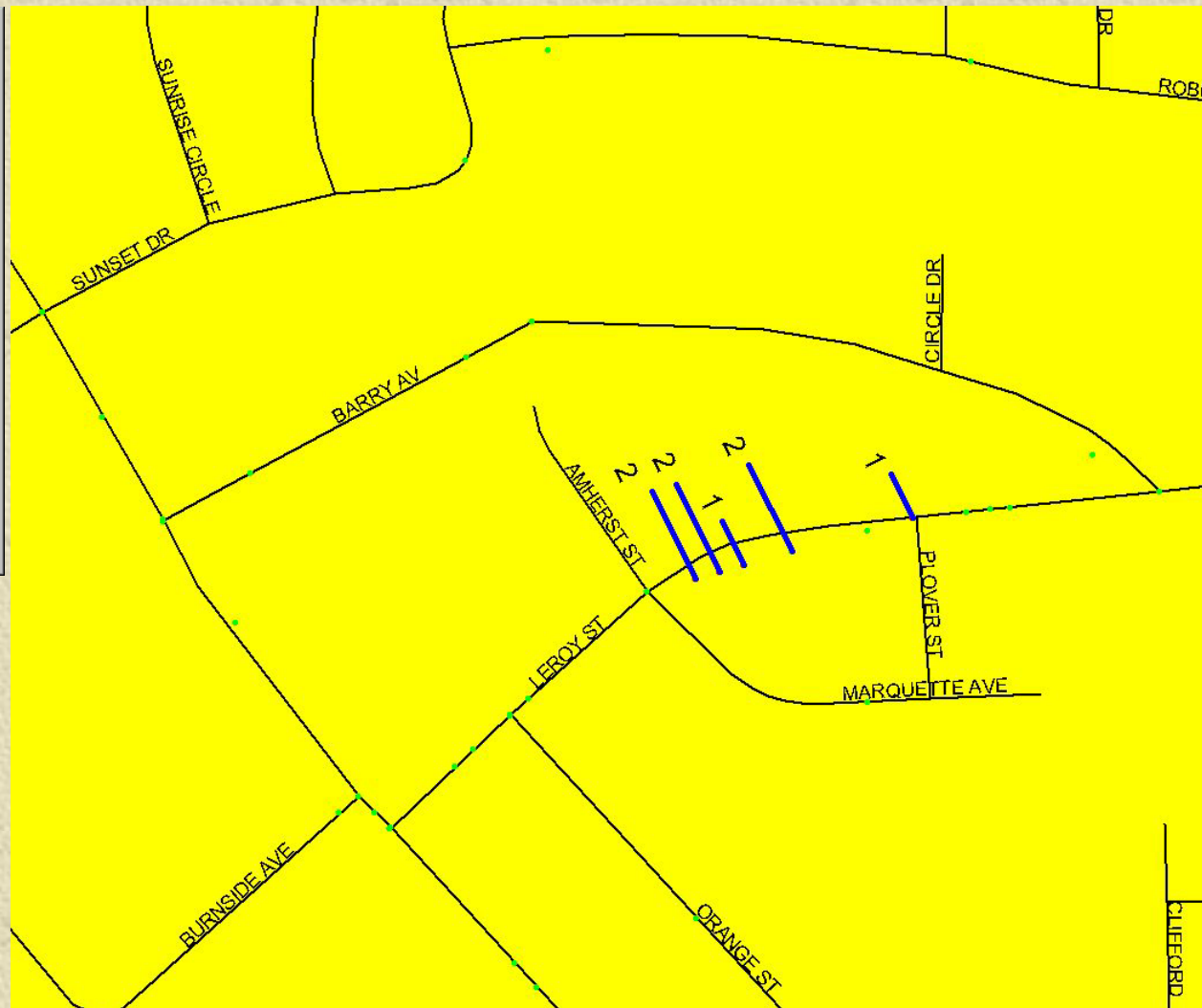
1998  
Muscatine  
Crashes: Fatal: 0 Injury: 1 PDO: 0  
Injuries: Unknown: 0 Fatal: 0 Major: 1 Minor: 0 Possible: 0

meeting the following criteria:  
(This feature currently not operational.)

equals:

Crashes: Total: 8 Fatal: 0 Injury: 4 PDO: 4  
Injuries: Total: 5 Fatal: 0 Major: 1 Minor: 0 Poss/Unk: 4

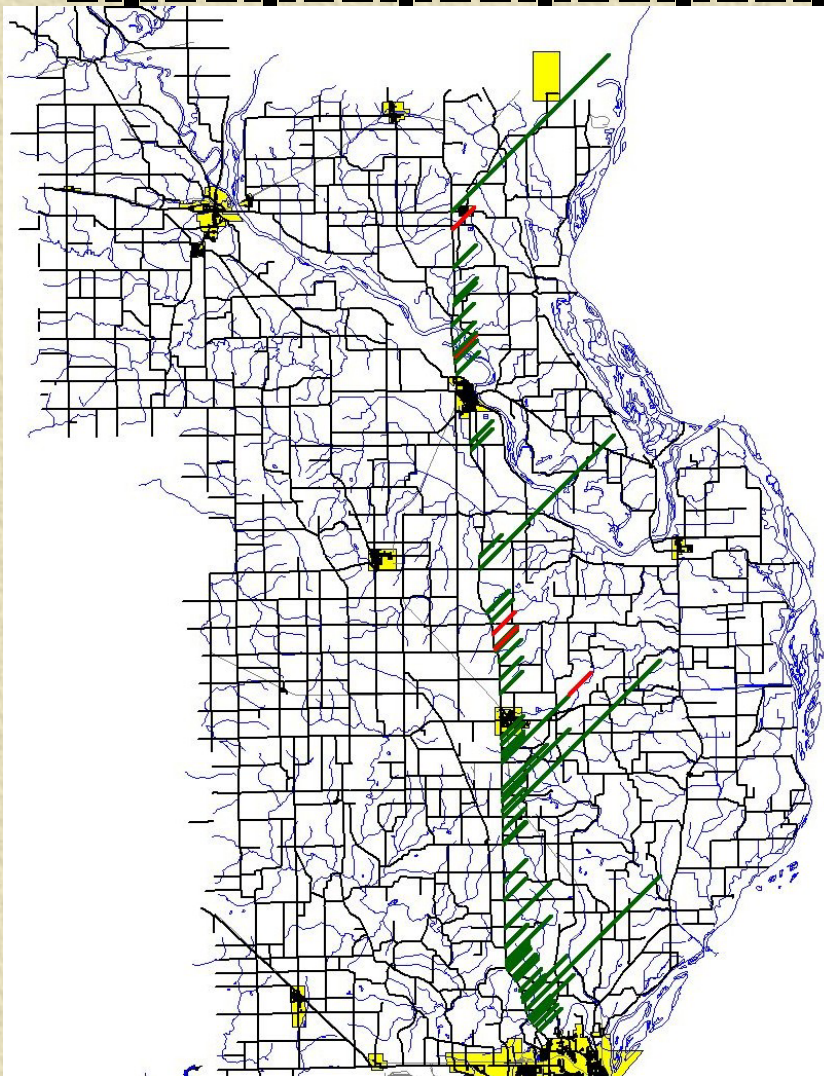
OK



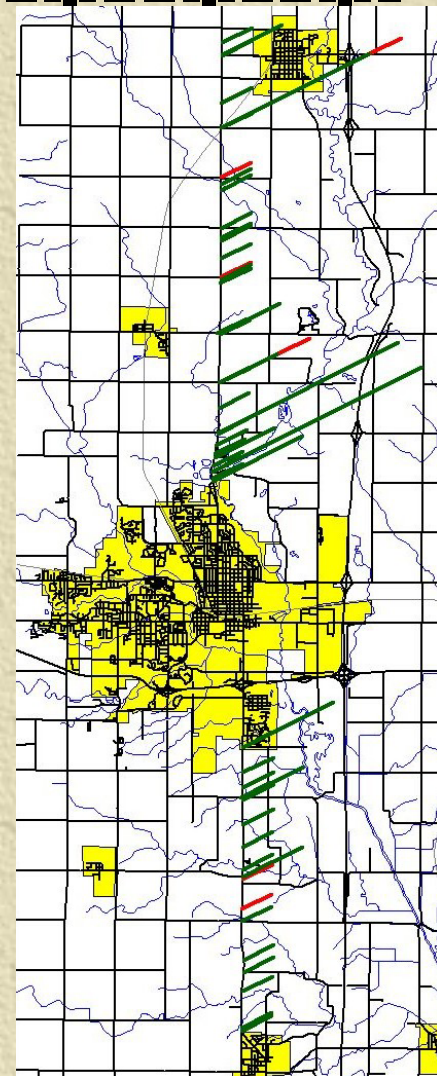
Muscatine, Iowa:  
Utility Pole  
crashes

# SAVER: Examples

Stacked: Thematic Lines  
Fatal Crashes  
Major Injury Crashes



Des Moines -  
Louisa

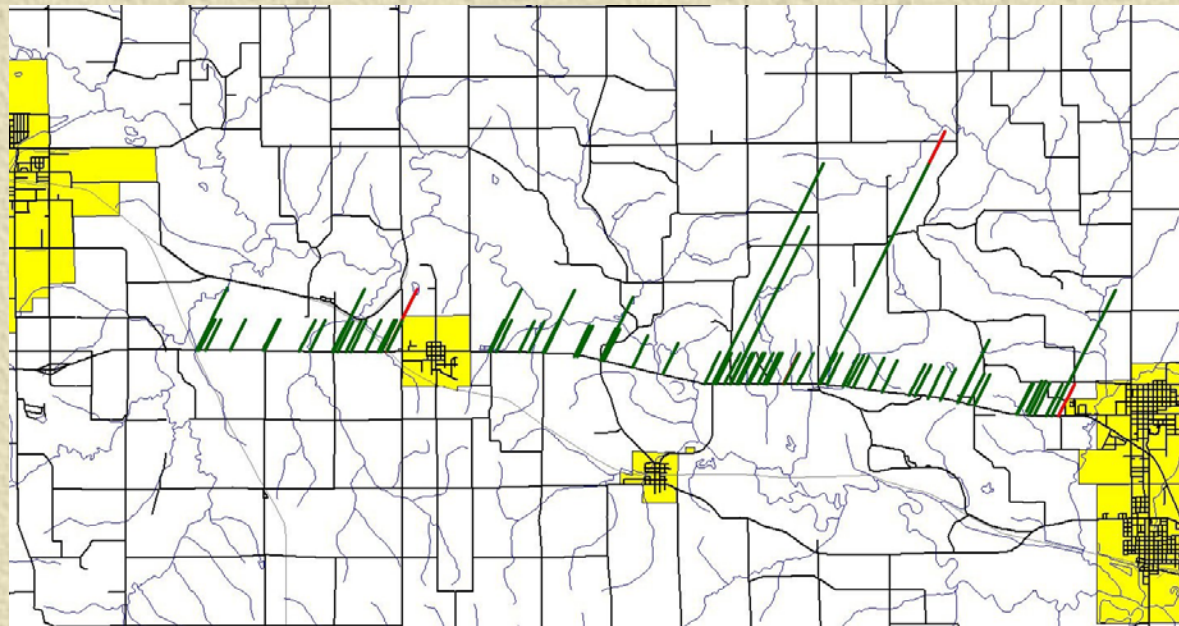


US 69: Huxley  
to Story City



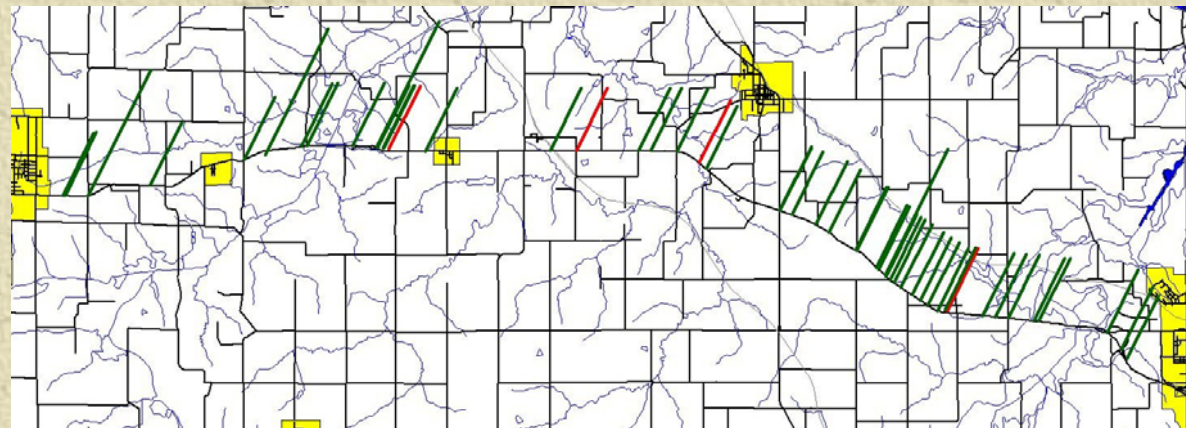
# SAVER: Examples

Stacked: Thematic Lines  
Fatal Crashes  
Major Injury Crashes



US 30:  
Marshalltown to  
Tama/Toledo

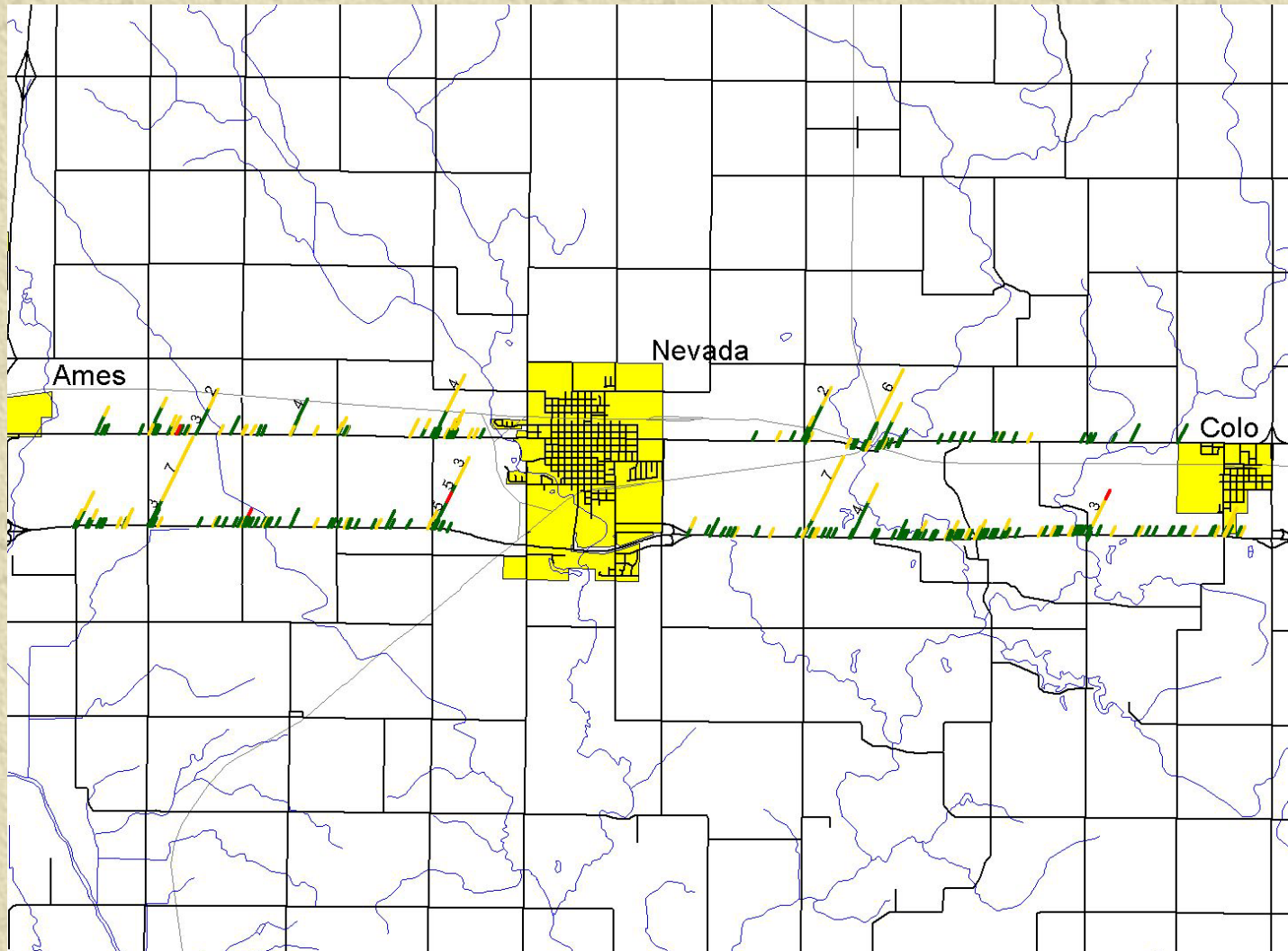
Marion - Warren





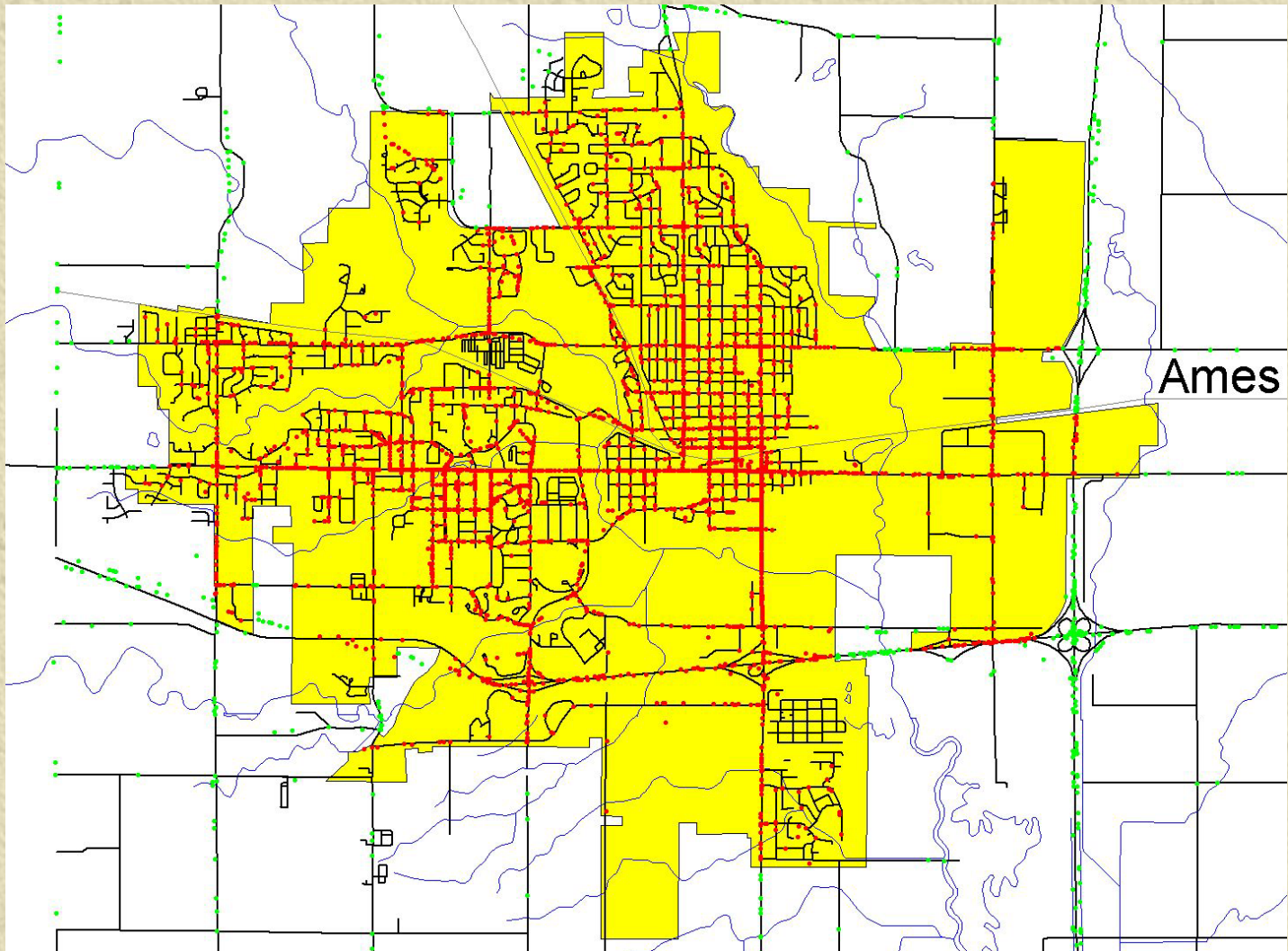
# SAVER: Examples

Ames, IA to Colo, IA  
US 30 vs. Old Lincoln  
Highway



# SAVER: Examples

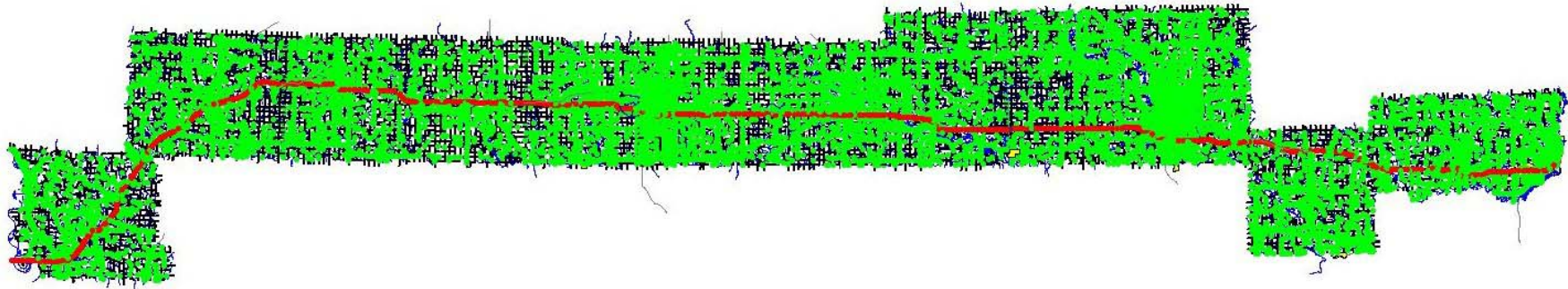
Crashes within  
Ames, IA





# SAVER: Examples

US 30 across Iowa



Stacked based on Crash Severity

